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AF/1714



PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of: **KAZUYUKI NAKATA** CASE NO: **AD-6705**

APPLICATION NO.: **09/890,028** GROUP ART UNIT: **1714**

FILED: **JULY 24, 2001** EXAMINER: **NILAND, PATRICK DENNIS**

FOR: **AQUEOUS DISPERSION COMPOSITION AND MANUFACTURING
METHOD FOR THE COMPOSITION**

APPEAL BRIEF UNDER 37 C.F.R. 1.192

Commissioner for Patents

P. O. Box 1450

Arlington, VA 22313-1450

Sir:

In support of the Notice Of Appeal, concerning the above-identified application, filed on December 5, 2003 the following Appellant's brief is filed herein in triplicate. An oral hearing is requested. Please charge any fee associated with this Appeal Brief to E.I. du Pont de Nemours and Company Deposit Account 04-1928.

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(1) Real Party in Interest:

E.I. du Pont de Nemours and Company, Inc. (as assignee)

(2) Related Appeals and Interferences:
None

(3) Status of claims:

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB 2269822 Best in view of US Pat. No. 5319019 Nothnagel.

(4) Status of Amendments:

All amendments have been entered.

(5) Summary of Invention:

The invention relates to the discovery that an aqueous dispersion consisting essentially of an ethylene-methacrylic acid copolymer containing 15 to 35 weight percent methacrylic acid comonomer (based on total weight of copolymer), water and ammonia in excess of the amount needed to neutralize the methacrylic acid of the copolymer (namely from 110% to 150 % stoichiometric relative to the carboxyl group) will produce thermodynamically stable, uniform, and alkali metal free dispersions (preferably without the use of surfactant) characterized by shelf life measured in terms of a year or more and the discovery that these aqueous dispersions are useful in producing coatings on substrates that are waterproof.

(6) Issues:

Does the Best reference (GB '822) serve as a basis for a *prima facie* showing of obviousness?

Is there support for combining the teaching of Nothnagel ('019) with the primary reference '822 and if so is there a resulting *prima facie* showing of obviousness?

Is there sufficient evidence of unexpected results in the present specification to establish a basis for over coming a *prima facie* showing of obviousness?

(7) Grouping of Claims:

Claims 1 through 8 constitute a group of claims directed to aqueous dispersions compositionally.

Claims 8 and 9 constitute a group of claims directed to coated substrates using the aqueous dispersions.

Claims 11 and 12 constitute a group of claims directed to a process for making the aqueous dispersions.

Claims 4 and 7 will constitute a subgroup within the above first identified group for which patentability will not rise or fall with the remainder of the group.

(8) Arguments:

First Issue: Does the Best reference (GB '822) serve as a basis for a *prima facie* showing of obviousness?

In asserting the final rejection of Claims 1-12 under 35 U.S.C. 103(a) the initial sentence reads as follows: "Best discloses the instant claimed dispersion except does not disclose the instantly claimed excess of ammonia nor the instantly claimed melt flow rate."

This observation by the Examiner is further support at page 4 second complete paragraph (first sentence) as follows: "The acid group of the Copolymer, measured by the acid no., can be neutralized partially or completely, be it by Ammonia and or Amine." And, is confirmed in the two examples wherein less than the stoichiometric amounts of ammonium hydroxide are employed.

In contrast, Table II and III of the present application disclose 3 examples at 130% NH₃ and five comparative examples involving 3 at 100% NH₃ and 2 at 75% NH₃ (see Table II). Table III presents the results with the use of terms "Uniform", "Non-uniform", and "Not dispersed" as defined on previous page 7. The three examples using 130% NH₃ have a "Uniform" appearance meaning that the dispersion contains no non-uniform substances and remained stable for an extended period of time (underlining added for emphasis). Page 4, lines 18-20, teaches self life with neither the particle size nor the viscosity changing over time of up to a year or more.

Factually the compositions disclosed in Best do not represent thermodynamically stable dispersion and comparative evidence to this is presented in the instant set of examples. In view of this difference the Best reference can not serve as a basis for a *prima facie* showing of obviousness.

Second Issue: Is there support for combining the teaching of Nothnagel ('019) with the primary reference '822 and if so is there a resulting *prima facie* showing of obviousness?

In asserting the secondary reference (Nothnagel '019) the following statement is made: "It would have been obvious to one of ordinary skill in the art at the time of the instant invention to use the instantly claimed excess ammonia to give more stable polyacrylate dispersions for the reasons stated at column 10, line 62 to column 11, line 7 ...". In the process of reviewing this particular portion of the text of the secondary reference being relied upon by the Examiner it becomes apparent that Nothnagel is teaching the addition of excess ammonia to acrylate polymer dispersed in organic solvent for a different purpose. More specifically, column 10 lines 62 through 67 are as follows;

"In an important aspect of the invention, the acrylic polymer in the dispersion is substantially completely neutralized with ammonia and preferably should have

excess ammonia added effectively giving about 25% to about 50% more amine or ammonia than required for 100% neutralization of the polymer."

In the paragraph immediately above this quote the nature of the dispersion at the time of neutralization is identified at column 10, lines 46-52 as follows:

"In an important aspect of the invention, the amine salt of the acrylic polymer is made by dispersing the acrylic polymer with carboxylic acid functionality into the organic solvent. Thereafter the acrylic polymer is neutralized. After that neutralization, water having a pH above about 7 is added to solvent/acrylic polymer salt dispersion."

Nothnagel is teaching a method of inverting acrylic polymer dispersion in an organic solvent to achieve acrylic polymer dispersion in water with less than 2 wt% VOC. Descriptively this method involves taking the acrylic polymer and organic solvent from a polymerization reactor and first adding an excess of ammonia to neutralize acrylic acid comonomer content of the acrylic polymer. This dispersion is then subjected to an azeotropic distillation in the presence an ammonium hydroxide water solution to reduce organic content and replace it with water. Because ammonia is volatile it will exit overhead during distillation and as such Nothnagel teaches both recycle of the water/ammonia of the condensate (after breaking the azeotrope with xylene and phase separation) and adding make-up ammonia to the dispersion during distillation and inversion.

Clearly the disclosure in the secondary reference differs from the subject matter sought to be patented in that the acrylic polymer is not the same as the "an ethylene-methacrylic acid copolymer containing 15-35 wt% methacrylic acid based on total weight of copolymer". The purpose and function for the use of excess ammonia according to the secondary reference is to stabilize the acrylic polymer dispersion during removal of organic solvent by azeotropic distillation and simultaneous inversion to produce an acrylic polymer dispersion of less than 2% VOC content. In contrast, the instant invention deals with thermodynamic stability associated with lack of change in particle size and viscosity measured in terms of a year or more self-life of an ethylene-methacrylic acid copolymer aqueous dispersion.

In view of these differences one skilled in the art would not resort to combining the teachings associated with the use of excess ammonia during an azeotropic/inversion of the acrylic polymer dispersion as found in Nothnagel with the primary reference teaching of Best to achieve the instant discovery of thermodynamically stable dispersion of ethylene-methacrylic copolymer in water and "ammonia in an amount required for neutralizing 110-150% of the carboxyl groups". The Best reference deals with dispersion of ethylene-methacrylic copolymer in water that is shown in comparative examples of the instant specification to either be "Non-uniform" or "Not dispersed". The secondary reference fails to establish a *prima facie* showing of the criticality of having ammonia in an amount required for neutralizing 110-150% of the carboxyl groups

of an ethylene-methacrylic acid copolymer containing 15-35 wt% methacrylic acid in water to achieve a stable, uniform, and alkali metal free aqueous dispersion.

Third Issue: Is there sufficient evidence of unexpected results in the present specification to establish a basis for over coming a *prima facie* showing of obviousness?

Factually the lack of long-term stability of the ethylene-methacrylic acid copolymer water dispersion at 75% ammonia loading and 100% ammonia loading (i.e., corresponding compositions according to the teachings found in the primary reference Best) is presented in Comparative Example 1 through 5. Application Example 1 through 3 involving 130% loading of ammonia are shown to be stable for sustained period of time. The teaching of the initial addition of excess ammonia to an organic solvent dispersion of acrylic polymer and subsequent replacing of ammonia during azeotropic distillation and inversion is a short lived process with no creditable implication of long term stability of the claimed ethylene-methacrylic acid dispersion. The data clearly constitutes a showing of unexpected results and the act of combining the two references to reject all claims is pure hindsight prompted by Applicant's disclosure.

In view of the above arguments it is felt that all claim are allowable and as such reversal and withdrawal of the Examiner's rejection under 35 U.S.C. 103(a) is requested.

Respectfully submitted,



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Dated:



(9) Appendix:

Claim 1. A stable, uniform, and alkali metal free aqueous dispersion consisting essentially of a dispersion in water of component (A), an ethylene-methacrylic acid copolymer containing 15-35 wt% methacrylic acid based on total weight of copolymer, and component (B), ammonia in an amount required for neutralizing 110-150% of the carboxyl groups of component (A).

Claim 2. The aqueous dispersion of claim 1 wherein the ethylene-methacrylic acid copolymer contains 18-30 wt% methacrylic acid based on total weight of copolymer.

Claim 3. The aqueous dispersion of claim 1 wherein the ethylene-methacrylic acid copolymer contains 15-25 wt% methacrylic acid based on total weight of copolymer.

Claim 4. The aqueous dispersion of claims 1, 2, or 3 wherein the ammonia is present in an amount sufficient to neutralize 120-140% of the carboxyl groups.

Claim 5. The aqueous dispersion of claim 1 wherein the ethylene-methacrylic acid copolymer comprises 5-50 wt% of the dispersion based on total weight of dispersion and the copolymer has a melt flow rate of 50-2000 grams/10 minutes at 190°C/2160 gram load.

Claim 6. The aqueous dispersion of claim 3 wherein the ethylene-methacrylic acid copolymer comprises 5-50 wt% of the dispersion based on total weight of dispersion and the copolymer has a melt flow rate of 50-2000 grams/10 minutes at 190°C/2160 gram load.

Claim 7. The aqueous dispersion of claim 4 wherein the ethylene-methacrylic acid copolymer has a melt flow rate of 60-1500 grams/10 minutes at 190°C/2160 gram load.

Claim 8. The aqueous dispersion of claim 5 wherein the ethylene-methacrylic acid copolymer has a melt flow rate of 60-1500 grams/10 minutes at 190°C/2160 gram load.

Claim 9. A coated substrate obtained by applying the aqueous dispersion of claim 1, 2 or 3 to the substrate for coating, then drying to form a coated substrate.

Claim 10. The coated substrate wherein the substrate is a film.

Claim 11. A process for making a stable, uniform, and alkali metal free aqueous dispersion of ethylene-methacrylic acid consisting essentially of mixing an ethylene-methacrylic acid copolymer containing 15-35 wt% methacrylic acid based on total weight of copolymer in water in the presence of sufficient ammonia to neutralize 110 to 150% of the carboxylic acid groups in the ethylene-methacrylic acid copolymer for a sufficient time to uniformly disperse the ethylene-methacrylic acid copolymer in the water.

Claim 12. The process of claim 11 wherein the mixing is carried out at a temperature of about 90 to about 150°C for about 10 minutes to about 2 hours.



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Dated: January 30, 2004

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